Polarizer in Focal Region
Abstract

For a linearly polarized light, if a polarizer is placed orthogonally with the polarization of the input light, it is supposed to block the light. This is true only for the case of normal incidence, but not for non-paraxial cases. To model such effects, an idealized polarizer model for non-paraxial case is implemented. As an example, the field behind a rotatable polarizer in the focal region of a high-NA focusing lens is analyzed.
Modeling Task

input plane wave
- wavelength 633nm
- linearly polarized in x direction

aspheric lens
- NA=0.66
- Edmund 49113

polarizer (rotatable)

What is the field behind a polarizer illuminated by highly focused beam?
Results

Fully vectorial simulation of light propagation through high-NA lens takes only 4 seconds!

Field in focal plane, *in front of* the polarizer.
Results

Idealized polarizer model takes the polarization crosstalk effects into account for non-paraxial cases.

[S. Zhang, et al., “A non-paraxial idealized polarizer model,” prepared for submission]
Results

\[ \alpha = 0^\circ \]
\[ \alpha = 90^\circ \]


animation displaying light behind polarizer when it rotates around z axis for 180°
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